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GLACIAL FEATURES ON THE SOUTH SIDE OF BEARTOOTH PLATEAU, WYOMING

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During the summer of 1916 the writer spent a number of days in the basin of Clarks Fork, along the southern margin of the Beartooth Plateau. In the course of the work there several interesting glacial features were noted. The general situation, together with the localities mentioned, are shown on the accompanying map, compiled from the Shoshone National Forest Map and from the Crandall Quadrangle.

That portion of the Beartooth Plateau lying between Clarks Fork and the Wyoming-Montana state boundary has been severely glaciated. The plateau averages over 10,000 feet in elevation and consists of bare, rounded knobs of granite, interspersed with lakes and swamps. Several of the northward-flowing streams that rise south of the state line head in typical cirques, occupied by small lakes. Glacial striae were noted at several points. The valleys of Line Creek and Bennett Creek, near where they emerge from their canyons in the granite on to the plains of the Bighorn Basin, are occupied by well-marked moraines. Little Rock Creek shows distinct evidences of glaciation but has a less pronounced moraine at the canyon mouth. There are slight evidences of a moraine at the mouth of the Clarks Fork canyon itself. On the south wall of that canyon numerous granite bowlders are to be seen several hundred feet above the contact of the Cambrian on the pre-Cambrian granite.

It is, however, in the valleys of Dead Indian Creek, Elk Creek, Sunlight Creek, and Russell Creek that the most interesting conditions obtain. In the Sunlight basin, a well-defined moraine occurs along the line between sections 15 and 16, T. 55 N., R. 105 W. It is referred to by Hewett, who says of it, "Sunlight Basin appears

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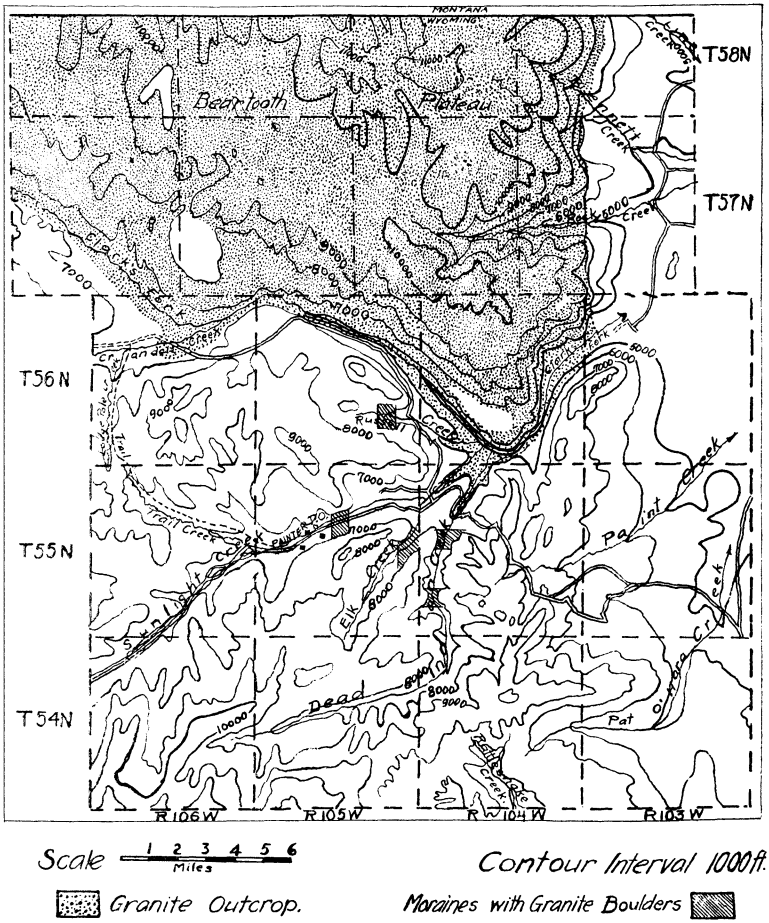
[1] Published by permission of the Wyoming state geologist.

to owe its origin to the damming of a deep glacial valley by a terminal moraine, which is a prominent feature a mile below Painter post-office, and behind which an accumulation of glacial gravel and lake sediment has formed the present valley floor."[1]

GLACIAL FEATURES
of a Portion of
BEARTOOTH PLATEAU, WYOMING



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[1] D. F. Hewett, "Sulphur Deposits of Sunlight Basin, Wyoming," *Bull. U.S. Geol. Surv. No. 530*, p. 352.

Hewett failed, however, to call attention to the most marked and interesting feature of the moraine, namely, that the bowlders of which it is composed consist largely of granite, and this in spite of the fact that a careful search for many miles revealed no granite outcrops *up the valley* from the moraine. A glance at Hague's map of the Crandall Quadrangle[1] shows that in his mapping he located no granite outcrops in Sunlight valley within the area of that quadrangle, that is, in the area above the moraine. Almost as striking as the dominance of the granite in the moraine is the relative scarcity of andesite, although not far above the moraine in question the andesite walls of the basin close in, almost entirely cutting out the sedimentary series.

In view of the above-mentioned conditions the conclusion seems inevitable that the glacier moved up the valley, not down. The broad U-shape of the valley above the moraine may be due in part to glacial scour, the glacier at one time having occupied a more advanced position than it did when the moraine in question was being built. It is more than probable, however, that the U-profile is largely the result of the glacial fill resulting from deposition in the valley when occupied by the ice-dammed lake. Much of the old lake bed is still very flat and swampy.

Along Elk (Elkhorn) Creek, on the line between sections 13 and 24, T. 55 N., R. 105 W., is another well-marked moraine, in the bowlder-clay of which were noted striated bowlders of limestone, granite, and Deadwood flat-pebble conglomerate. Very little andesite occurs in the moraine, though the andesite walls close in completely, only about three miles above. A careful search up creek from the moraine to where the andesite covers all the older rocks shows no exposures older than the Madison limestone (Mississippian), although both granite and Deadwood (Cambrian) conglomerate bowlders were found occurring abundantly in the moraine. Again the conclusion is inevitable that the ice moved up the valley.

Similar conditions were noted well toward the head of Russell Creek, where moraines with very little andesite and much granite were found resting directly on andesite outcrops. Along Lodge

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[1] Arnold Hague, *Absaroka Folio,* No. 52.

Pole trail, on the pass at the head of Lodge Pole Creek, granite bowlders were found high on the andesite slopes, nearly 1,500 feet above the contact of the Paleozoic series on the granite.

Similarly moraines on Dead Indian Creek carry much granite, and granite bowlders were noted on andesite outcrops on the south side of the low pass between the head of Dead Indian Creek and Rattlesnake Creek. This occurrence is eight miles south of any granite outcrop and nearly 2,000 feet above the contact of the Paleozoic upon the pre-Cambrian, near the mouth of Dead Indian valley.

In the light of these facts it would seem that the Beartooth Plateau was occupied by an ice cap that sent several tongues eastward into the edge of the Bighorn Basin, and a number southward across the Clarks Fork Canyon several miles *up the valleys* of Sunlight, Elk, Russell, and Dead Indian Creeks.